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ANTAGONISTIC EFFECTS OF SELECTED MICROBES ON *Fusarium* spp.

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA, Malaysia. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any other degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate Universiti Teknologi MARA, Malaysia, regulating the conduct of my study and research.

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ABSTRACT

A study was conducted to evaluate the antagonistic activities of selected fungal and bacterial species which included *Aspergillus nidulans*, *Aspergillus niger*, *Penicillium chrysogenum*, *Trichoderma reesei*, *Bacillus subtilis*, *Pseudomonas aeruginosa* and *Serratia marcescens* towards the plant pathogens, *Fusarium sacchari* and *Fusarium oxysporum* f. sp. *batatas*. All the selected microorganisms were found to have antagonistic activities against the fungal pathogens when evaluated by the dual culture assay on potato dextrose agar at 30°C for duration of 9 days of incubation. The strongest microorganism for both fungal pathogens was *T. reesei* followed by *A. niger, P. aeruginosa, P. chrysogenum, A. nidulans, B. subtilis and S. marcescens*. The involvement of mycoparasitism or antibiosis activity was also investigated. Microscopic observations of mycelial samples from the interaction area from the dual culture assay plates showed that the hyphae of *Fusarium* spp. were either lysed, fragmented, shriveled, swelled, deformed and became stunted. Deformities, disintegration and lost of the structural integrity of the pathogen conidia were also observed. Antibiosis in the microbial cell-free culture filtrates and methanol crude extracts was detected using agar well diffusion assay and broth assay. Antibiosis activity towards both fungal pathogens was only detected in cell-free culture filtrate and methanol crude extract of *P. aeruginosa* in the broth assay. There were no antibiosis activity showed by the other microbial crude extracts. Analysis of gas chromatography mass spectrometry was detected the presence of compounds namely cycloheptasiloxane, tetradedecamethyl and 1,1,1,5,7,7,7-Heptamethyl-3, 3-bis (trimethylsiloxy) tetrasiloxane in the methanol crude extract of *P. aeruginosa* which may responsible to the antibiosis activity. From this study, the selected microbes that have the potential to be biological control agents for plant diseases caused by *F. sacchari* and *F. oxysporum* f. sp. *batatas* are *T. reesei, A. niger* and *P. aeruginosa*.

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